

# Comparison of FORTE RF and field-change array observations.

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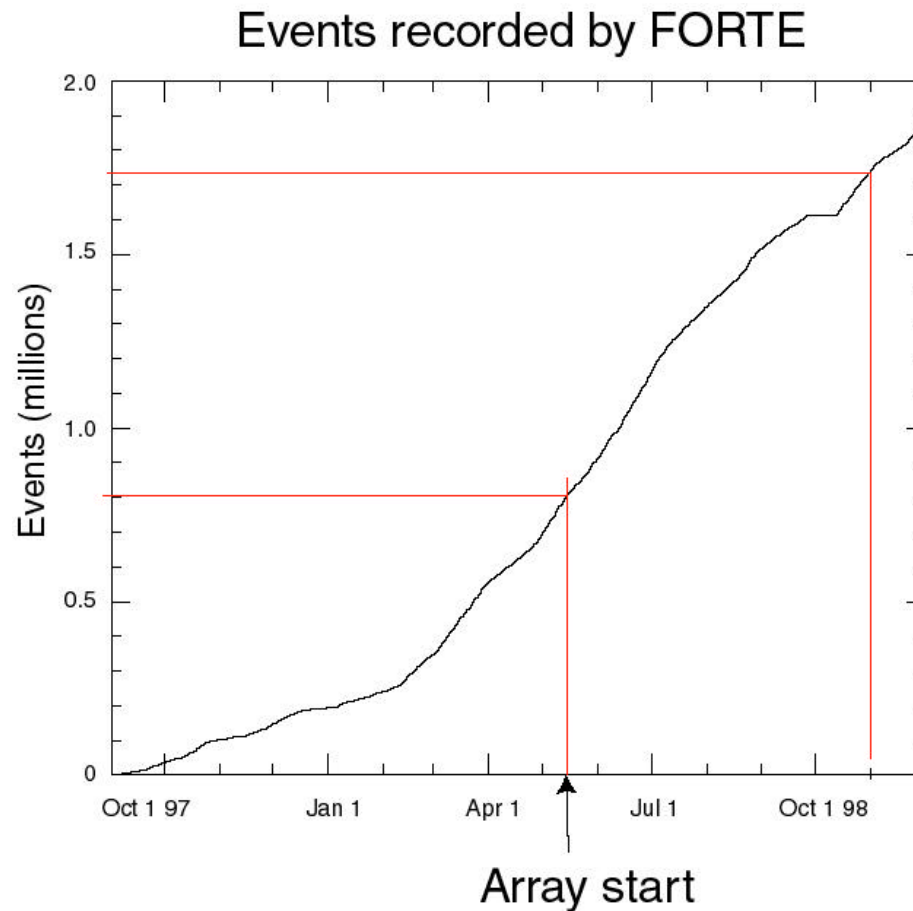
# Outline

- How often do the array and FORTE see the same thing?
- What kinds of events are seen by both systems?
- What can we learn from these results?

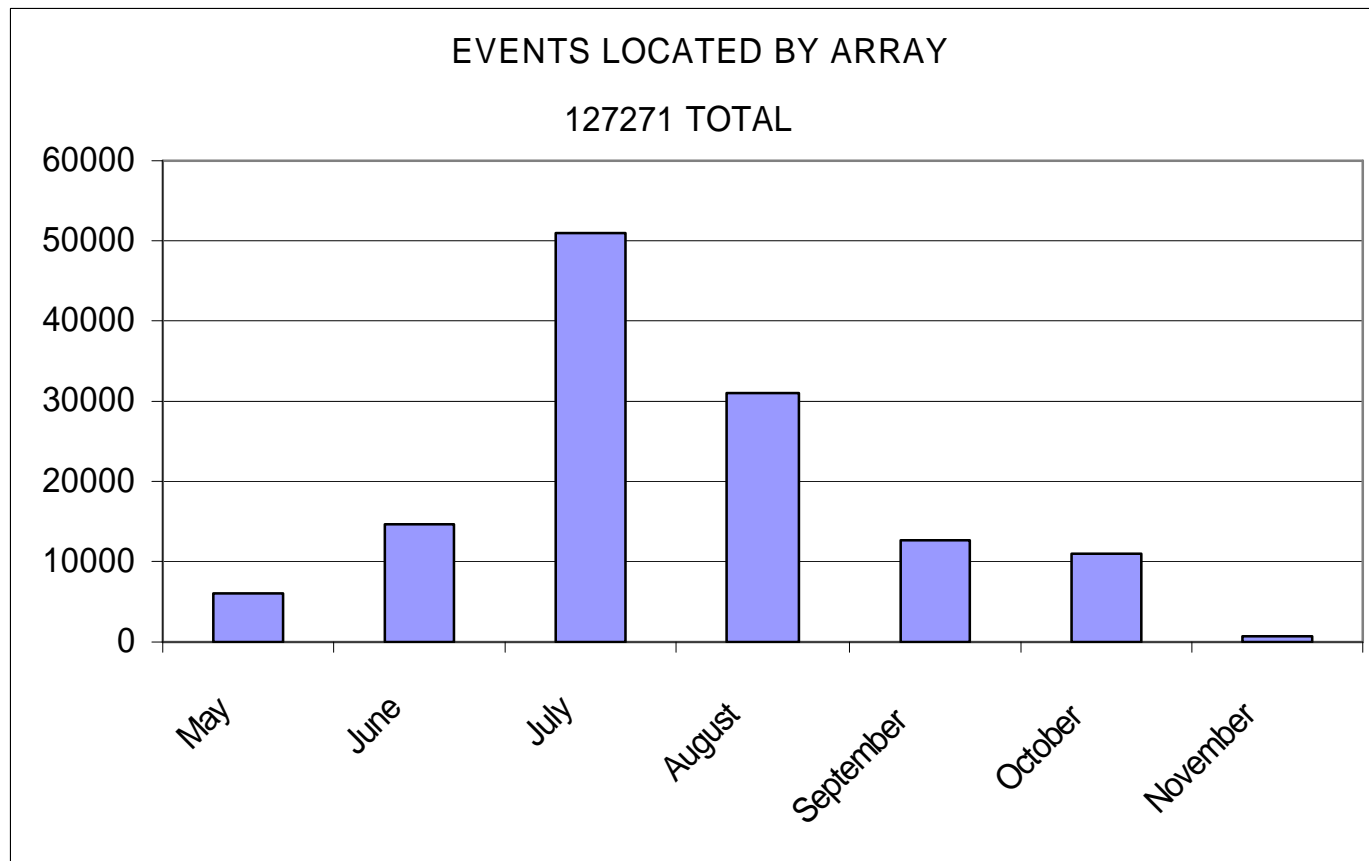
# Topics

- May storms
- TIPPs
- Reflection heights

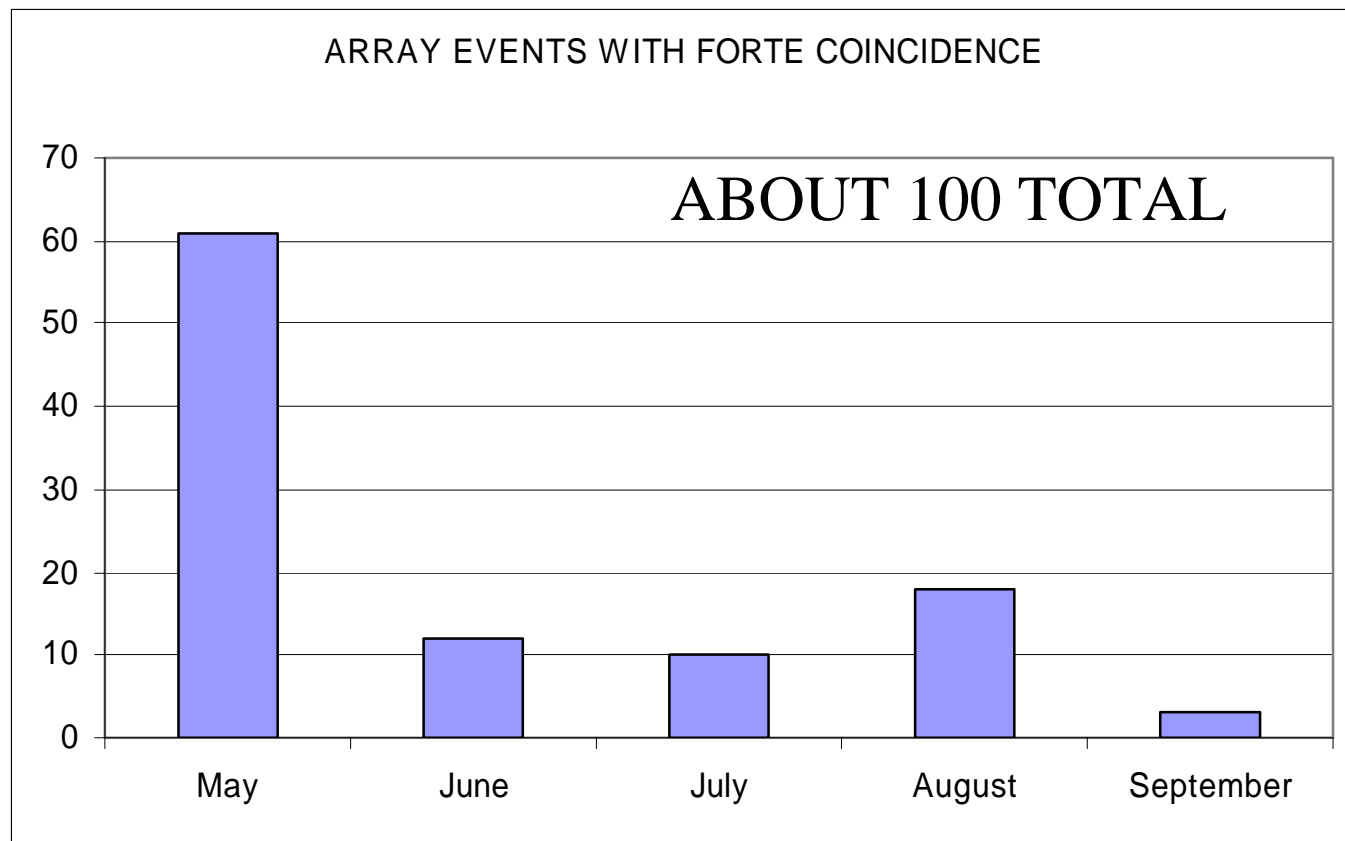
# FORTE DETECTED A MILLION EVENTS SINCE ARRAY STARTUP



# THE ARRAY DETECTED OVER 100,000 EVENTS



# BUT WE'VE SEEN VERY FEW COINCIDENCES.



# THERE ARE SEVERAL REASONS

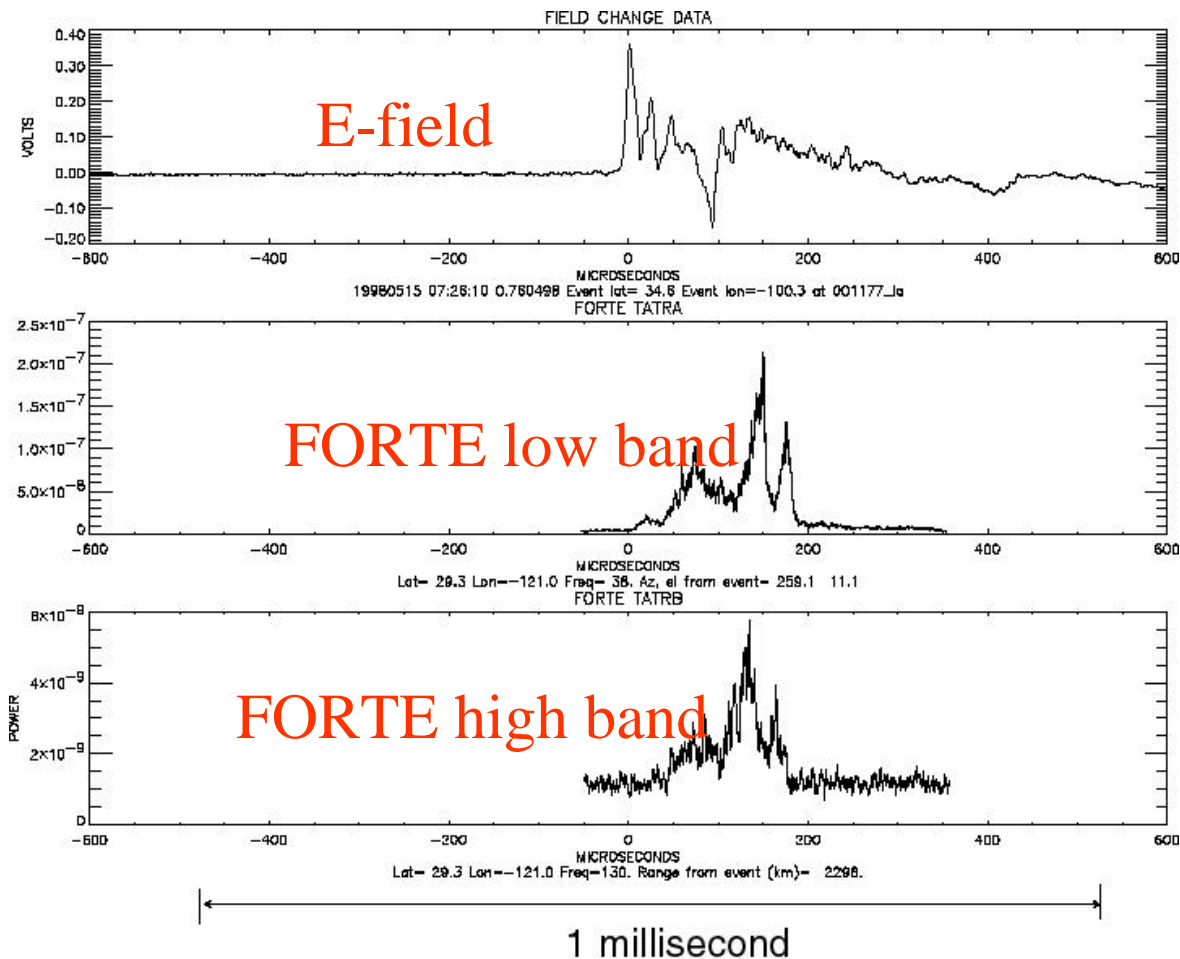
- FORTE DOESN'T HOVER OVER THE  
ARRAY.
  - (SEE WORK BY I. NEWTON)
- WHEN IT IS OVER THE ARRAY,  
THERE AREN'T ALWAYS STORMS.
- ON ASCENDING PASSES, THE  
MEMORY IS SOMETIMES FULL FROM  
TROPICAL STORMS.

# COINCIDENT EVENTS ARE OF SEVERAL TYPES

- CLOUD-TO-GROUND
  - POSITIVE AND NEGATIVE
- INTRACLOUD (RARELY)
- NARROW BIPOLAR EVENTS

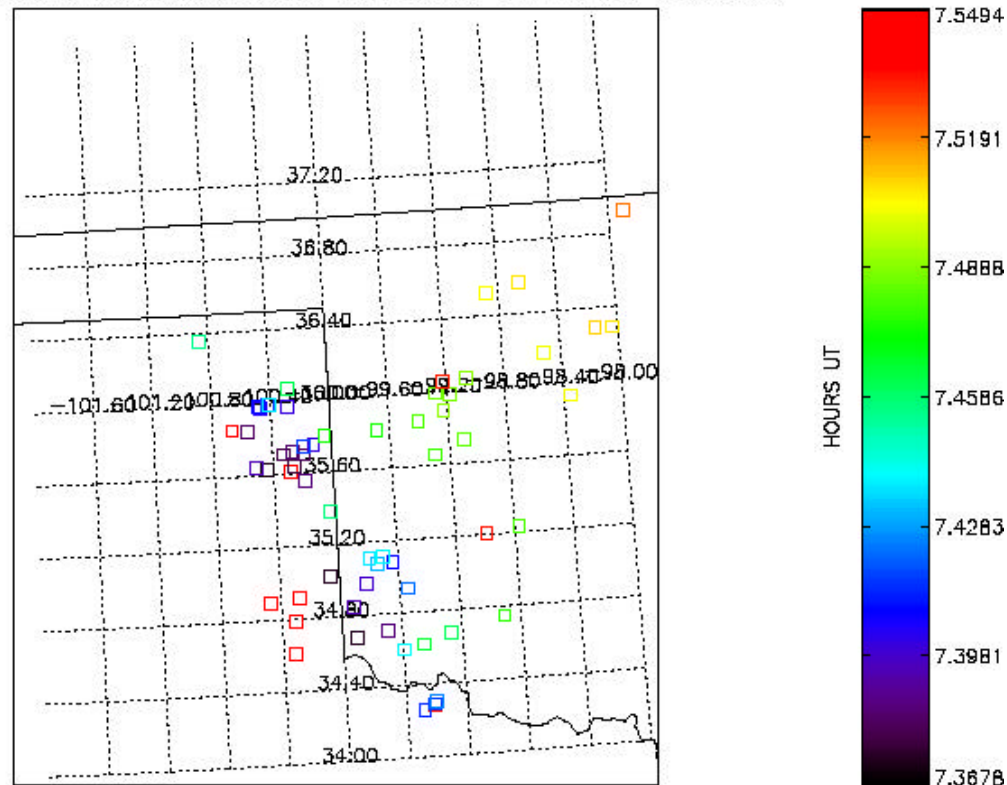
# THE STORMS IN MAY HAD AN UNUSUAL FRACTION OF POSITIVE CGS (NEARLY ALL)

Times are  
retarded to  
the event  
location.



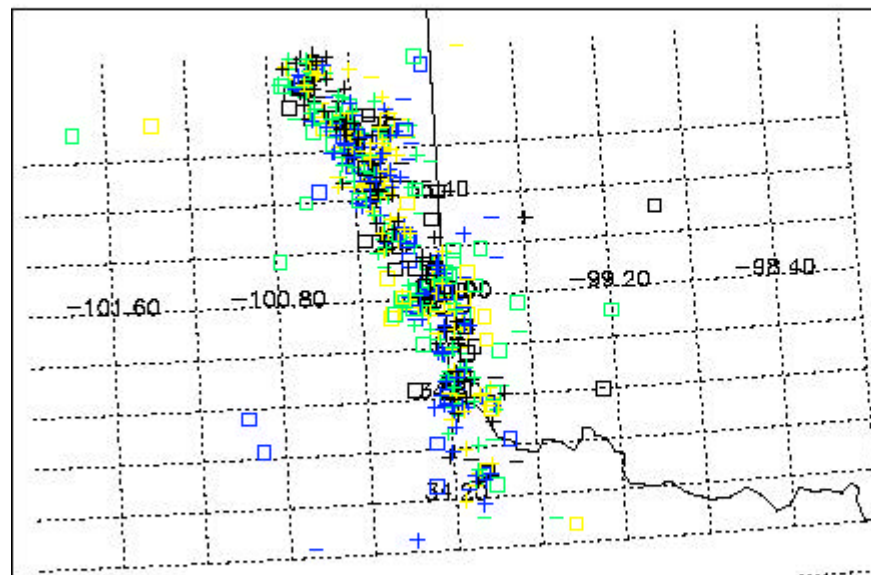
# EVENTS DETECTED BY FORTE AND THE ARRAY ON ONE PASS, MAY 15

19980515.loc Time from 07:22:00 to 07:33:00 Minimum of 3 stations

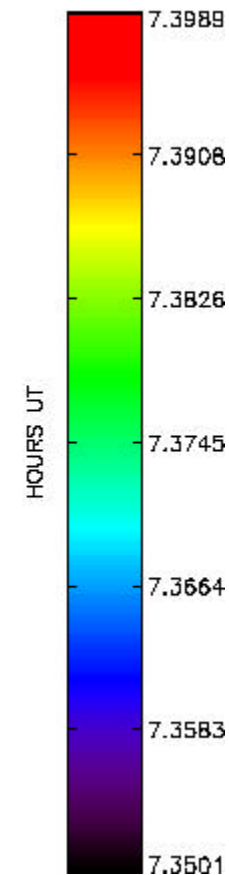


# NLDN LOCATIONS FOR THE SAME MAY 15 PASS

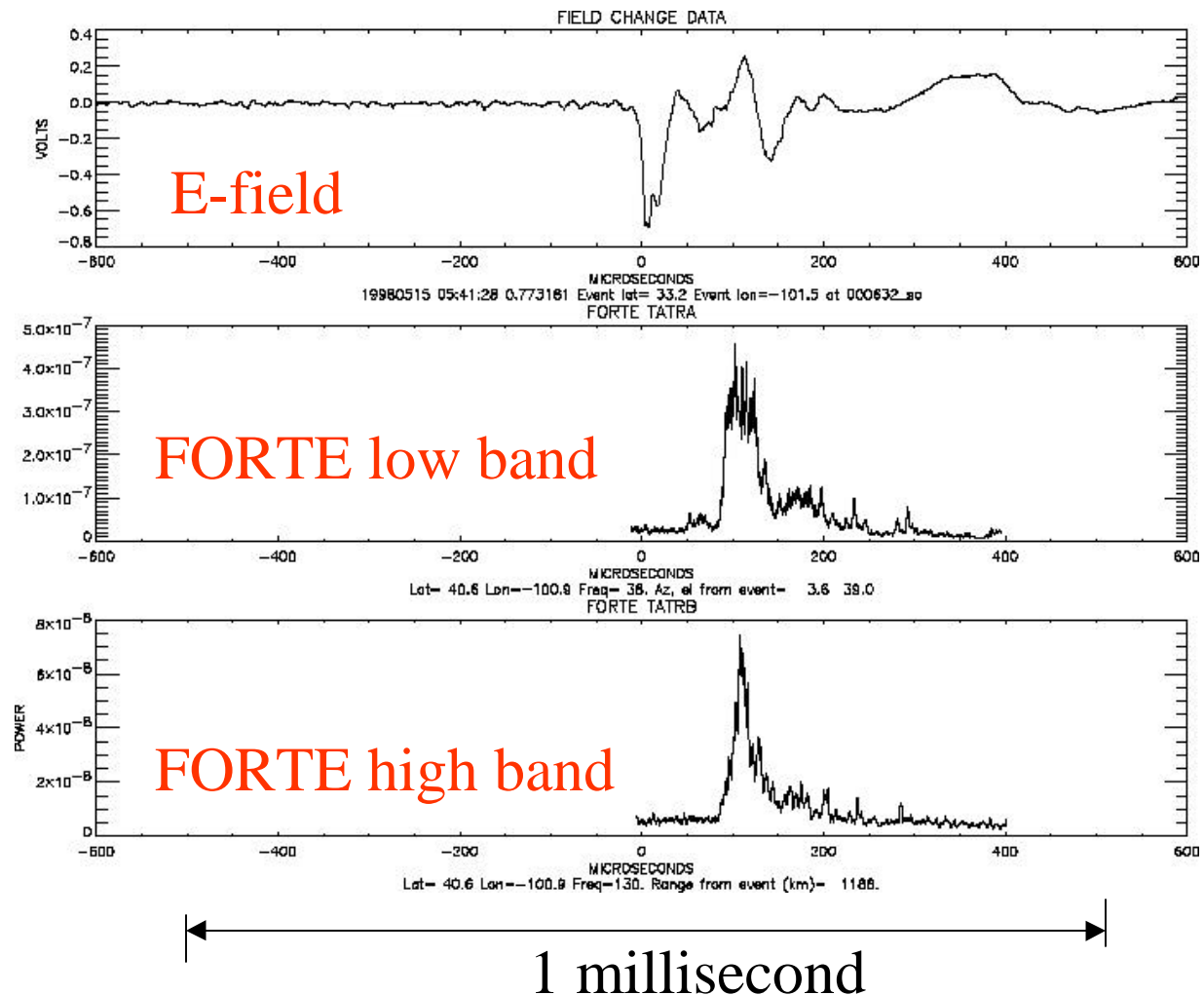
19980515.cut Time from 07:21:00 to 07:31:00



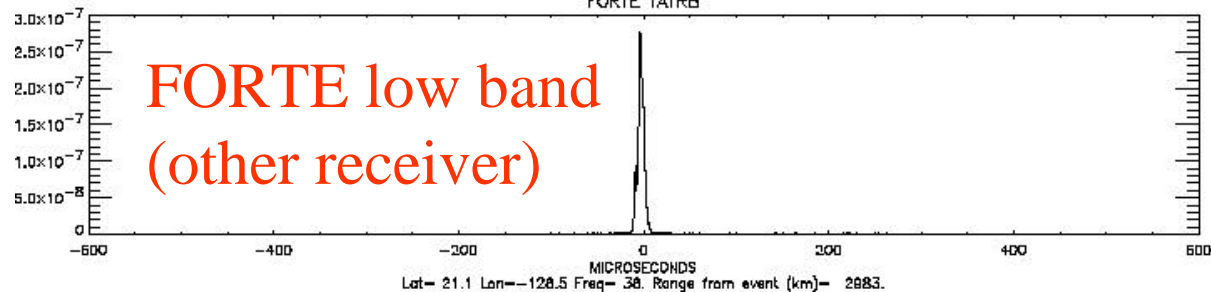
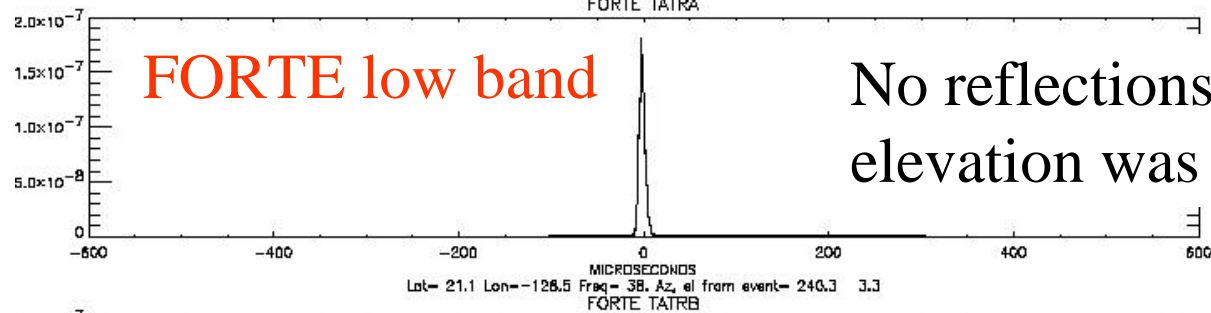
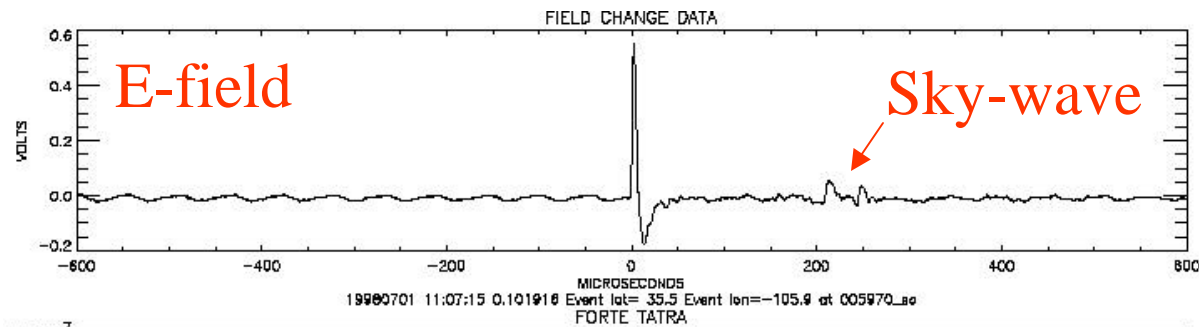
110 NEGATIVE CG, 442 POSITIVE CG, 112 "ZEROS"



# BUT THERE WERE SOME NEGATIVE CGS

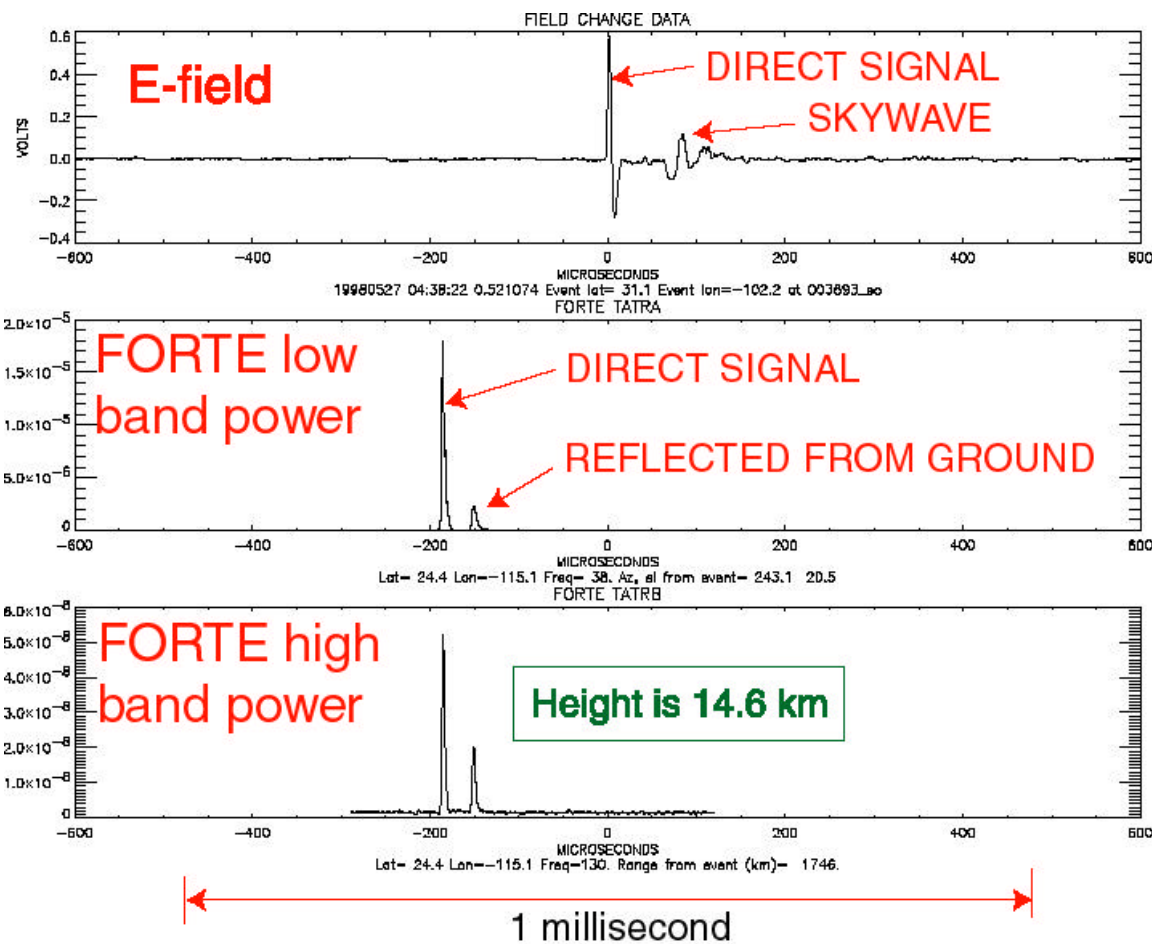


# AND WE SAW POSITIVE BIPOLAR EVENTS



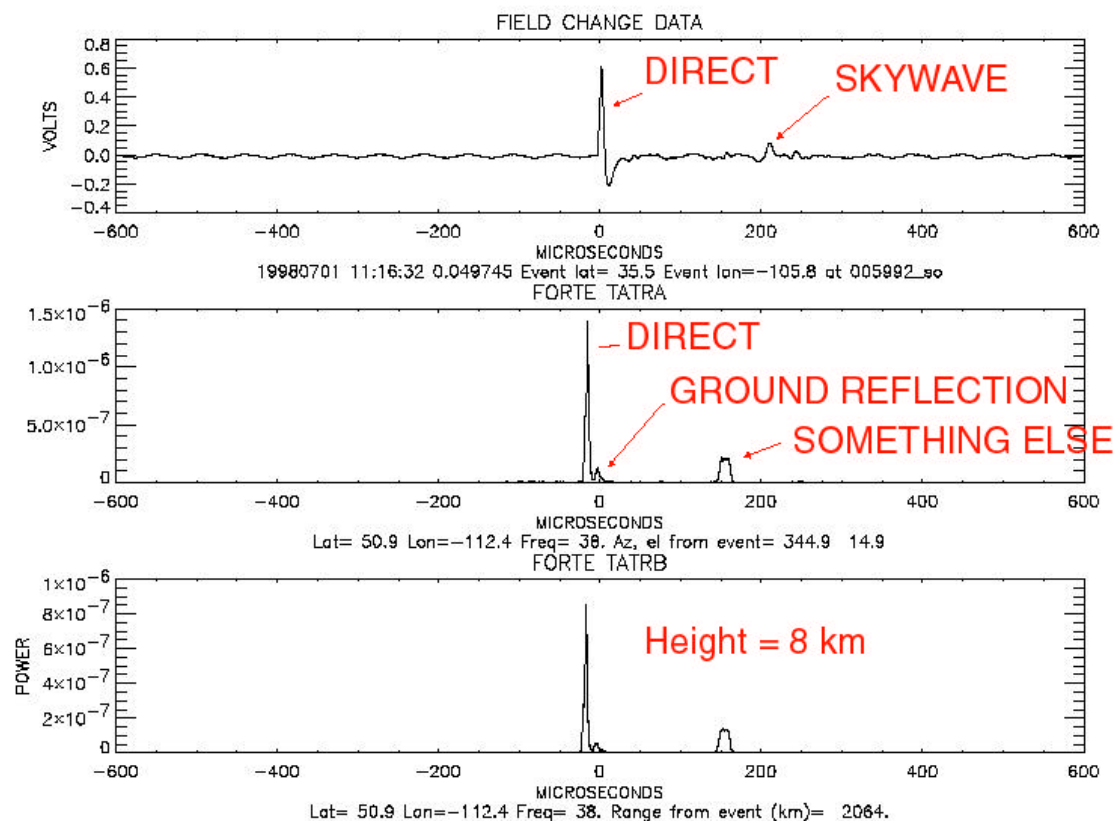
1 millisecond

# WHEN NARROW EVENTS HAVE REFLECTIONS, WE CAN DEDUCE THE SOURCE HEIGHT



Height from sky-wave analysis is 12.5-14 km

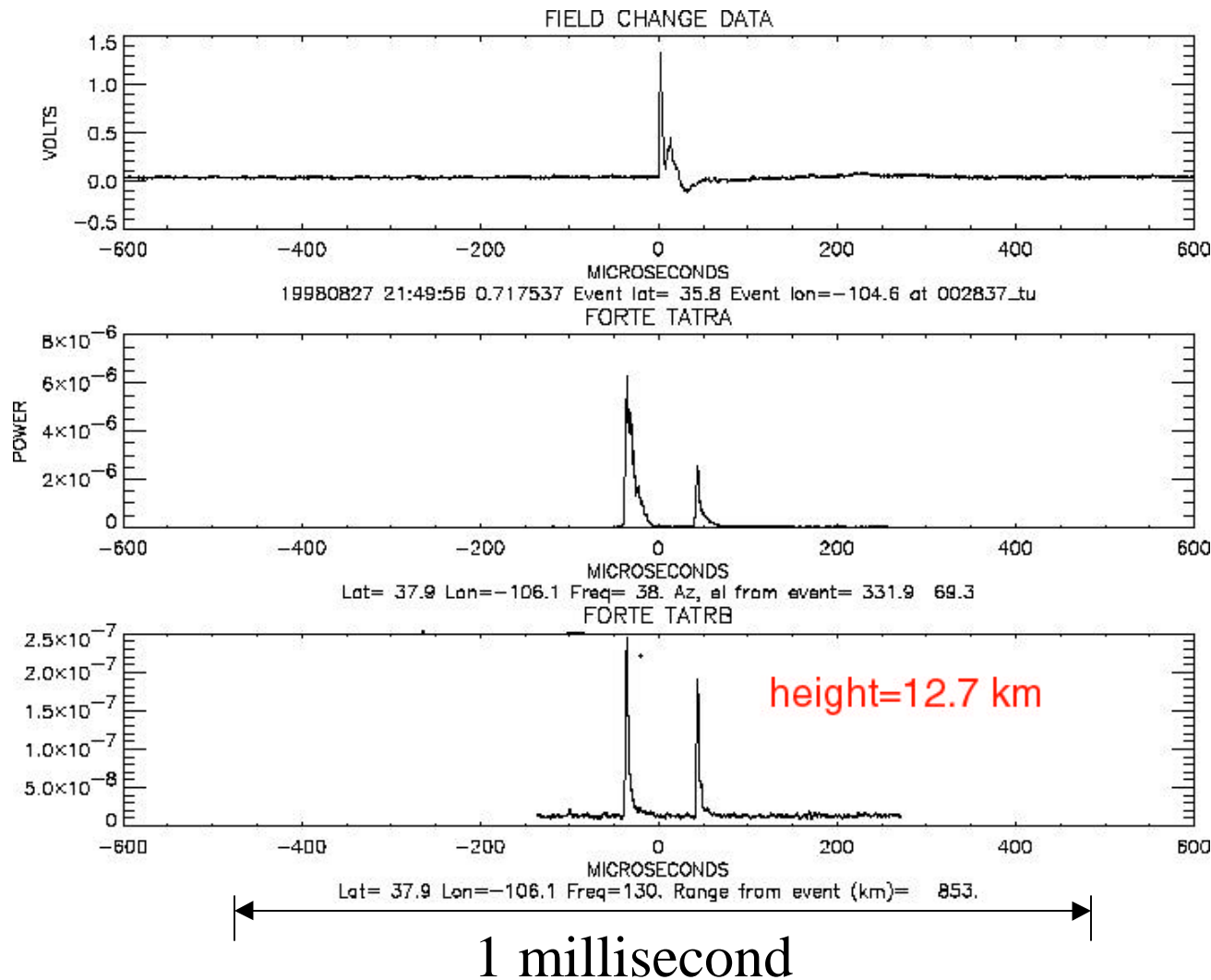
# EXAMPLE AT LOW ELEVATION ANGLE



Height from sky-wave analysis is 7.5 km

1 millisecond

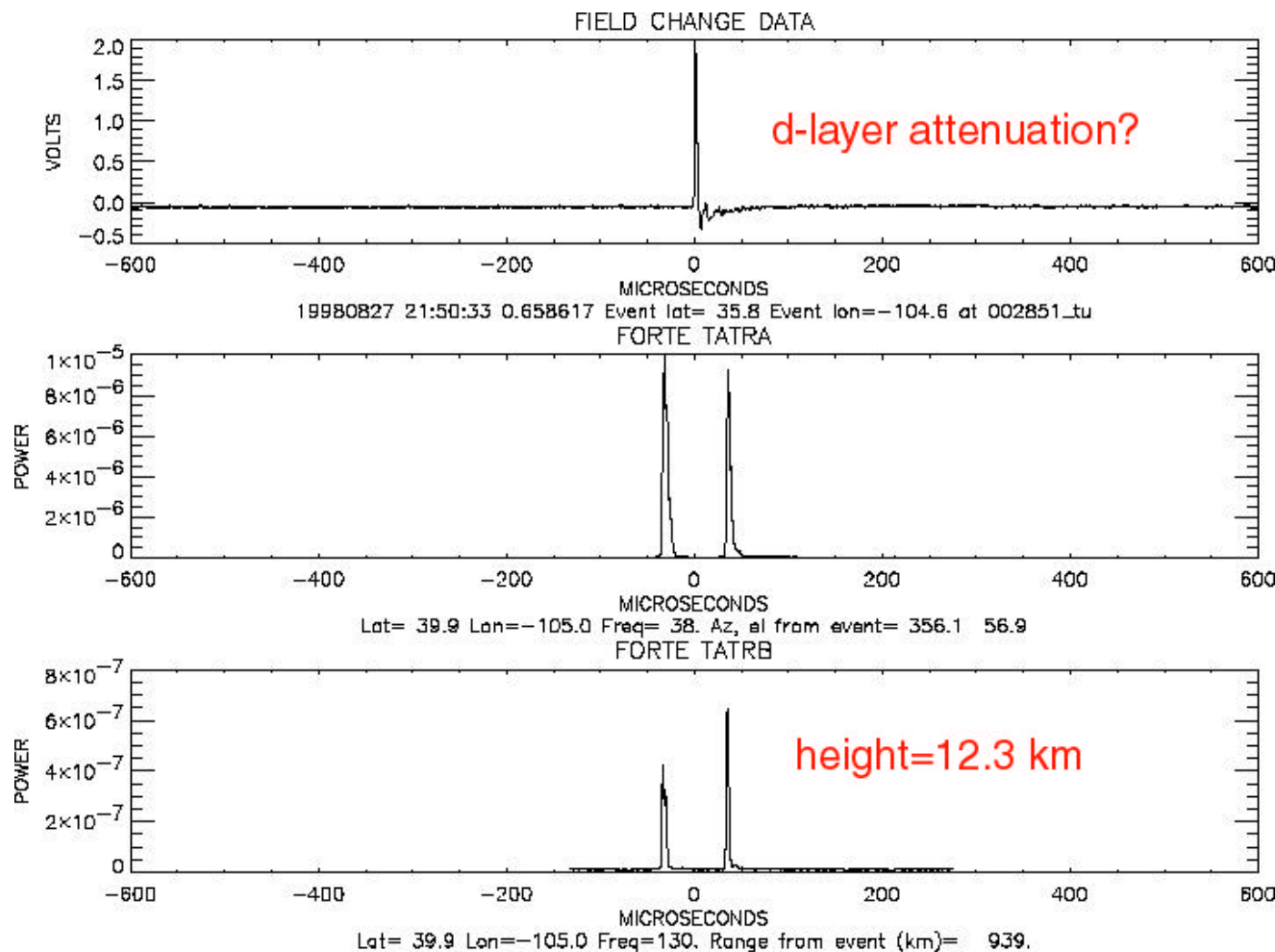
# NARROW BIPOLAR?



Height from  
sky-wave  
analysis was  
11 km.

# ANOTHER EXAMPLE

Height from  
sky-wave  
analysis was 13  
km.



1 millisecond

# SOME CONCLUSIONS

- FOR PROVIDING EVENT IDENTIFICATION, NLDN IS GENERALLY BETTER THAN OUR ARRAY, BECAUSE OF ITS NATIONAL COVERAGE.
- THE ARRAY EXCELS AT LOOKING AT THE DETAILS OF WAVEFORMS, AND AT NARROW BIPOLAR PULSES THAT NLDN DOESN'T USUALLY SEE.
- NEXT SEASON WE'LL EXPAND THE ARRAY AND BETTER COORDINATE ITS OPERATION WITH FORTE.